

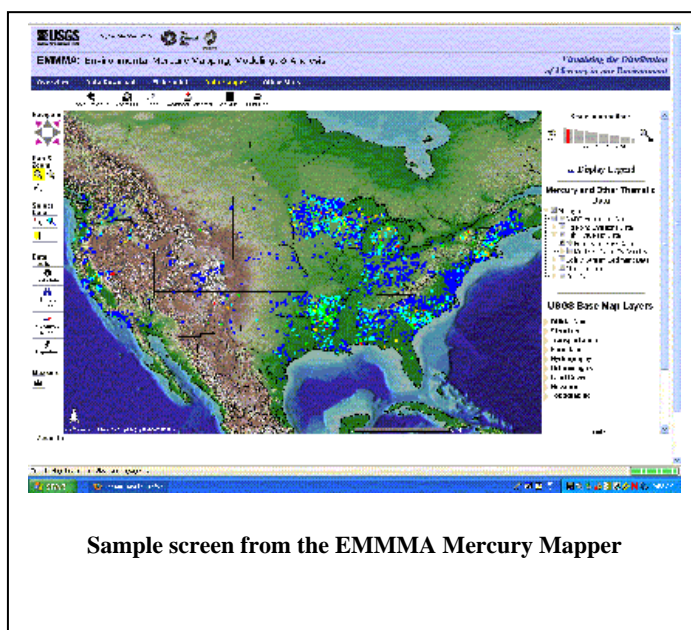
FY 2005 EMMA Task Summary

Environmental Mercury Mapping, Modeling, and Analysis (EMMMA)

The EMMMA Web site (<http://emmma.usgs.gov>) supports mercury research and decision-making by providing tools for **Mapping**, **Modeling**, and **Analysis** of mercury data. The development of the Environmental Mercury Mapping, Modeling, and Analysis (EMMMA) site and online, interactive tools, now in its fourth year (formerly known under the acronym ENCEDAS), continues in Fiscal Year 2005 as a task under Geographic Analysis and Monitoring (GAM's) "Health and the Environment" Project with additional funding from the National Institute of Environmental Health Sciences.

During the current Fiscal Year (2005) the EMMMA task will focus on the problems of geographic modeling and analysis of environmental mercury, with the hope and expectation that the prototype methods and tools developed for mercury may be generalized for use with other environmental toxics in future years.

As with many environmental contaminants, mercury can be harmful to humans and wildlife even at extremely low concentrations. Researchers and managers must measure the occurrence and distribution of mercury in the water, soil, air, and biological tissues of our environment. Because of the expense of these analyses, and because the relationships between environmentally available mercury (in the water, soil, and air) and tissue concentrations of mercury in plants, animals, and humans are not fully understood, obtaining enough information – and the right information – to protect the health of humans, wildlife, and the environment is an ongoing challenge. The EMMMA web site (<http://emmma.usgs.gov>) helps scientists and public-policy makers to make more effective use of available mercury data by providing tools to visualize the geographic distribution of mercury throughout our environment – from place to place and from year to year.



Sample screen from the EMMMA Mercury Mapper

EMMMA provides an authoritative set of toxics data and an interactive mapping capability for viewing these data in a geographic context. The EMMMA task will supply the Mercury Mapper with additional and updated data during Fiscal Year 2005, and research into methods of using interactive mapping in the environmental analysis of toxics data will continue.

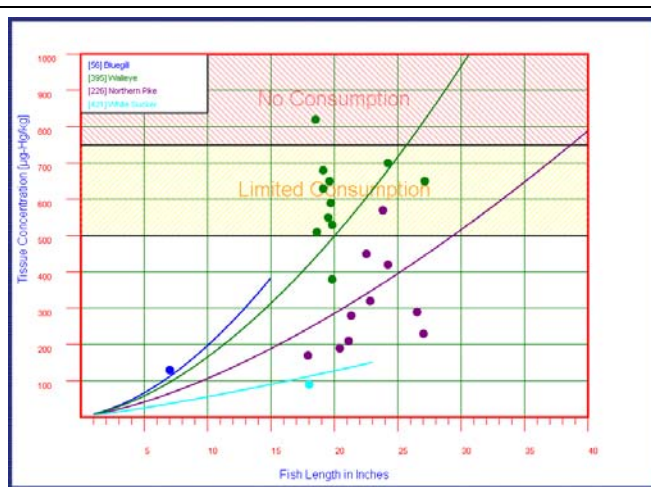
A prominent component of the EMMMA effort and Web site is the deployment of a National Model of Mercury in Fish Tissue. To support interactive use of this Model by decision makers, EMMMA provides dynamically generated charts and graphs to allow researchers and decision-makers to visualize actual and predicted fish-tissue mercury concentrations. During Fiscal Year

2005 the chart-and-graph capability will be enhanced and features will be added to provide new capabilities for online analysis and visualization of environmental-toxics data. The potential of EMMMA to promote collaboration among geographically dispersed researchers will be explored

through the development of new interactive online tools.

Specific major EMMMA efforts in Fiscal Year 2005 will include:

- To work cooperatively with EPA and various State agencies to test, evaluate, and refine the National Model of Mercury in Fish Tissue deployed on the EMMMA Web site, especially for purposes of supporting States and localities in issuing balanced, location-specific advisories about the safe



Sample graph dynamically generated by EMMMA

consumption of fish. (The primary pathway of toxic human exposure to mercury is through eating freshwater and marine fish.)

- To locate, acquire, validate, and incorporate new fish-tissue data into the EMMMA database on mercury in fish tissue and the National Model of Mercury in Fish Tissue, with special emphasis on acquiring data for marine species.
- To modify the National Model of Mercury in Fish Tissue to enable more reliable extrapolation of temporal trends and improved prediction of fish-tissue mercury concentrations for sites and species where recent data are lacking or sparse.
- To conduct a statistical analysis of sampling errors and residuals in the National Model of Mercury in Fish Tissue so confidence intervals on Model predictors can be displayed on EMMMA website graphics.
- To develop or to acquire a database identifying the species and sizes of fish actually occurring at sites across the country so that predictions of the National Model of Mercury in Fish Tissue can be limited (when appropriate) to the species and lengths of fish known to have been observed at a particular location.
- **Provided by D. Donato – February 3, 2005**